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a great mass of scattered observations upon this subject. We occasionally need some one with sufficient patience to look over whole libraries of scientific books and especially periodicals and cull out and put together in compact form all that pertains to some one subject. It saves all the rest of us a great deal of time, besides giving information that would either escape us or be contained in books we could not easily reach. Mr. James has done just this work, and what is almost as important, has carefully referred us to all the sources of his information.

**New Plants of New Mexico and Arizona.**—*VICIA LEUCOPHAEA*.—Annual; sparingly villous-hirsute throughout; 2 feet high, climbing by tendrils; stems wing-angled, sparingly branched, slender; leaflets 6, linear-oblong, entire, mucronate; stipules semi-sagittate; peduncles mostly 2-flowered; calyx teeth subequal, as long, or the lower a little longer than the tube; corolla 4 lines long, cream-color, the vexillum purple-veined; style very villous at the apex; legumes pubescent, 8-seeded.

Along streams in the higher mountains of south-western New Mexico, flowering in July and August. Not at all common, and but few specimens obtained. Very distinct from all our other species by its pubescence and the color of the flowers; but the latter in fading change to purple.

*PHASEOLUS PARVULUS*.—Stems solitary from a small, round, deep-seated tuber, slender, erect, 3-6 inches high, neither branched nor twining; stipules ovate-lanceolate, acuminate; leaflets an inch long, linear-lanceolate, mucronate, entire, or the lateral each with a more or less distinct lobe on the outer margin at the base; peduncles longer than the leaves, mostly 1-flowered; upper lip of the calyx entire, acute, the teeth of the lower longer, lanceolate; corolla  $\frac{3}{4}$  of an inch long and narrow, deep violet; the linear legume nearly straight, more than an inch long, compressed, 8-10-seeded; seeds short-reniform, smooth, flecked with purple.

Abundant in deep woods of *Pinus ponderosa*, in the Pinos Altos Mountains, New Mexico, flowering in August. A diminutive, but with its large, violet corollas, most elegant species. The long peduncles are not rarely 2-flowered, bearing one at the end and the other an inch below it. The tuber is no larger than an ordinary hazel-nut, and never produces more than the one stem.

*POLEMONIUM FLAVUM*.—Stem 2-3 feet high, simple or corymbosely branched, clothed throughout with ample foliage, and nearly glabrous except at summit; leaflets from ovate to oblong-lanceolate; inflorescence corymbose-cymose; pedicels rather densely villous, and somewhat viscid-pubescent; calyx cleft below the middle, the lobes triangular-lanceolate; corolla an inch long, campanulate-funnelform, yellow, with tawny red outside, tube very short, lobes rhombic-ovate, tapering to a sharp point and not at all rotate-spreading, their margin lightly undulate or erose; stamens  $\frac{1}{2}$ - $\frac{2}{3}$ , styles  $\frac{3}{4}$ - $\frac{3}{4}$  as long as the corolla; seeds many in each cell, scarcely winged.

Cold northward slopes of the highest Pinos Altos Mountains, New

Mexico, growing with *Delphinium glaucum*, Wats. and *Eupatorium grandidentatum*, DC., in flower and fruit Sept. 15, 1880.

It is hard to establish, and somewhat hazardous to propose new species of *Polemonium*. The claim of specific rank for this very striking and beautiful plant I base upon the shape and color of the corolla. No other species but *P. confertum* shows a corolla whose limb is really funnellform, that is, not at all spreading; nor has any other form red-yellow flowers which show no tinge of blue or purple or flesh-color, even in fading. Its nearest ally is *P. foliosissimum*, while it has more the look of *P. carneum*.

PENTSTEMON PAUCIFLORUS.—Stems 2 feet high, suffrutescent at base, and with a few strict branches; the whole plant clothed with a very minute puberulence which is retrorse, except upon the inflorescence, where it is spreading and glandular; leaves linear, sessile, 1-2 lines wide, the lower 2-3 inches long, the upper gradually shorter; racemes few-flowered (only one pedicel from each pair of bracts); sepals ovate-to oblong lanceolate; corolla tubular, more than an inch long, bright scarlet, strongly bilabiate, the three lower lobes usually somewhat reflexed; sterile filament smooth; capsules acuminate.

On a bluff of the Gila River in the extreme south-western part of New Mexico near the border of Arizona, in flower August 30, 1880. Probably rare, as only two plants could be found. The species belongs to the *Elmigeria* sub-division of the genus, and the flowers look like those of *P. barbatus*, but the corolla is more deeply lobed and less strongly bilabiate than in that species, while the habit of the plant is very unlike that of any of the forms of it.

PENTSTEMON PINIFOLIUS.—Stems 1-2 feet high, shrubby and much branched, the lower  $\frac{1}{2}$ - $\frac{2}{3}$  naked and marked with the scars of the fallen leaves, the upper branches densely clothed with linear-filiform, glabrous, sharp-pointed, one inch long leaves, which are attenuate below, but widen at the very base into ciliolate margins by which the opposite pairs are nearly, or most usually completely connate; the slender thyrsus few-flowered; pedicels and lanceolate-acuminate sepals glandular hairy; corolla an inch and a half long, narrowly tubular, scarlet, the nearly linear segments almost a third the length of the tube, the lower bearded, but not at all reflexed; capsule ovate-oblong, not acuminate.

Summits of the San Francisco range, back of Clifton, in south-eastern Arizona, growing in crevices of rocks with *Fendlera Utahensis*, Greene, and flowering in September, 1880.

A near relative of the preceding species, yet well marked, and of very different aspect, with its lower, woody branches naked, and the upper clothed with the dense pine-like foliage. The corollas are not at all strongly bilabiate, and in all the dried specimens their color has faded to yellow.

HABENARIA BREVIFOLIA.—Stem a foot or two high and stout; leaves numerous, mostly less than 2 inches long, all but the lanceolate uppermost ones loosely sheathing the stem; bracts linear-lanceolate, all but the uppermost exceeding the greenish flowers, which are numer-

ous, in a long, rather dense spike; lateral sepals linear-oblong, 4 lines long, the upper ovate; lip linear or linear-lanceolate, entire, rather acute, nearly a half inch long, shorter than the spur; anther retuse; pedicels of the pollen masses slender; glands orbicular; capsule oblong, 6-8 lines long, sessile; root fleshy-fibrous.

Dry southward slopes of the Pinos Altos Mountains, New Mexico, in open woods of *Pinus ponderosa*, in flower September 14th, 1880.

A striking species, in floral character most like *H. sparsiflora*, Watson, which grows by shady streamlets in the same region, but of very different habit, being nearly leafless, the foliage reduced to mere loosely sheathing bracts, their tips only somewhat leafy-spreading, and the stout stems flowering from near the ground—EDWARD LEE GREENE.

**Peltandra Virginica.**—It is worth noting, if it has not already been done in some of our botanical serials, that Rafinesque in establishing the genus distinguished two species, *P. Virginica* and *P. undulata*. Modern botanists have accepted the former, and reduced the latter to a synonym. In the recent monograph of *Araceæ* by Engler *P. undulata* is restored to its distinctive position. Engler remarks that it has some similarity to *P. Virginica*, but differs in the inflorescence. The peduncle is shorter, not much longer than the petiole, the tube of the spathe is oblong not subfusiform, and the lamina of the spathe wholly green with no white anywhere about it. The female portion of the spadix is one-fourth to one-fifth the length of the male, while in *P. Virginica* it is two-thirds, and the ovary is few-, rarely one-ovuled, while *P. Virginica* has never more than one. Both forms have been freely distributed as *P. Virginica*. The true *P. undulata* has been noted in specimens of Canby from Delaware, Boott from Boston, Schweinitz from Pennsylvania, Porcher from South Carolina, and Rugel from the foot of the Black Mountains in North Carolina. Both species seem about equally distributed geographically.—T. M.

**Chlorophyll.**—In NATURE for April 14 Mr. Sydney H. Vines gives an interesting review of the results of Dr. Pringsheim's investigations into the nature and function of this puzzling substance. Dr. Pringsheim some time ago startled physiologists by announcing that chlorophyll was not the direct agent of assimilation, but rather a screen for protoplasm which in the light thus subdued did the work. Of course such a careful and conscientious investigator must have had some sure ground to stand upon and hence this subject of the formation of chlorophyll has attracted a good deal of attention. These later observations, referred to by Mr. Vines, are considered by Dr. Pringsheim as confirming the views he had before expressed.

It may be of interest to our laboratory workers to know that Dr. Pringsheim has been using a new method of treating chlorophyll corpuscles. He treats them with a dilute acid, or warms them in water, or exposes them to the action of steam. The result is that chloro-